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Kirkpatrick-Based Evaluation of IT-Oriented Extension to Improve Services in the PPHPM Farmers Cooperative

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ABSTRACT

Evaluation of extension activities is a process of assessing an extension program. Therefore, it is essential to conduct evaluations in every extension activity to determine the program's success. The goal of this study is to evaluate the outcomes of assessments using the Kirkpatrick method, specifically looking at Level 1 (Reaction) and Level 2 (Learning), to understand how information technology improves services in the PPHPM Cooperative in Purwobinangun Village, Pakem Sub-district, Sleman Regency. We conducted this research in April 2025 using a descriptive analysis method, distributing evaluation questionnaires to 20 PPHPM cooperative administrators. The results indicated that Level 1 evaluation scored 32.3, or an average of 4.61. Level 2 evaluation, conducted through pre-tests and post-tests, indicated improvements in knowledge (0.15), attitudes (0.5), and skills (2.75). The Extension Effectiveness (EE) in improving knowledge was 1.5% (categorized as less effective), attitudes 2% (less effective), and skills 91.67% (effective). The Extension Behavior Change Effectiveness (EBCE) for knowledge was 50% (moderately effective), for attitudes was 55% (moderately effective), and for skills was 91.67% (effective).

Contribution to Sustainable Development Goals (SDGs):

SDG 4: Quality Education

SDG 8: Decent Work and Economic Growth

SDG 9: Industry, Innovation, and Infrastructure

1. INTRODUCTION

1.1. Research Background

The development of the times demands that we learn and adapt to information technology, as nearly all aspects of society today have integrated it into daily life. The rapid advancement of information systems creates significant opportunities for improving public services. [1]. Digitalization, accompanied by efforts to enhance human resource capacity, is essential to improving service delivery. A study by Ref. [2], emphasized that digital transformation requires continuous assistance to ensure

the process runs effectively, particularly through the capacity building of human resources.

PPHPM (Horticultural Farmers Association of Mount Merapi) is a marketing cooperative established on September 24, 2013. It was formed to provide market access for farmers' products, increase the selling value and bargaining power of agricultural products, enhance knowledge in cultivation and marketing, and serve as a platform for collaboration and entrepreneurship among farmers. Based on observations and interviews, the services provided by PPHPM remain suboptimal. This lack of optimal service is caused by several underperforming aspects and organizational barriers [3]. PPHPM frequently encounters challenges in communication, service



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implementation, information technology usage, and human resource quality, resulting in ineffective service delivery.

The quality of human resources must be consistently maintained and improved to maximize services for farmers. Enhancing human resource quality is achieved through development efforts such as education and training. According to [4] Service quality is closely linked to customer satisfaction, and improving human resource quality can be achieved through training and development programs. PPHPM's weaknesses include limited communication processes, insufficient human resources, and a lack of oversight through policies concerning PPHPM's collection points. These challenges highlight the need for adequate human resource quality. Continuous education is essential to ensure the sustainability of assistance activities. [5].

[6] Argue that appropriate policies are essential for protecting cooperatives and should be developed based on existing problems that need to be addressed. Human resource capacity plays a crucial role in utilizing information technology, especially for PPHPM administrators. Ref.[7] emphasize that strengthening infrastructure and providing digital skills training are key elements in enhancing human resource capacity for effective information technology utilization. Improving service quality through information technology is both important and necessary in this context. [8].

Training on the use of information technology to enhance PPHPM's services will be evaluated using the Kirkpatrick method. Kirkpatrick's Four-Level Evaluation Model consists of four stages: Reaction, Learning, Behavior, and Results. [9]. Improving human resource quality through the use of information technology is highly beneficial for enhancing the quality of services provided by PPHPM. Considering the opportunities and strengths possessed by PPHPM, the extension material in this study is titled "Utilization of Information Technology as an Effort to Improve the Service Quality of PPHPM Administrators."

1.2. Literature Review

1.2.1. Extension

Extension (or outreach) activities aim to increase participants' knowledge and improve their mindset. [10]. Group extension methods typically include lectures, discussions, demonstrations, and hands-on practice. The lecture method involves a resource person or instructor delivering material directly to participants, emphasizing one-way communication. The discussion method facilitates the exchange of ideas between participants and the instructor. [10]. This method promotes two-way communication, making the training or extension process more interactive and engaging. Hands-on practice, meanwhile, is conducted collaboratively between the instructor and participants, allowing them to apply the knowledge and skills directly during the session.

1.2.2. Information technology

Information technology is a tool used to enhance accessibility, transparency, and accountability in the delivery of services to the broader public. [11]. It offers numerous benefits aligned with the demands of the modern era, and therefore must be utilized and managed optimally.

Information technology provides various advantages in daily life. It plays a significant role in improving service delivery,

building social networks, and sharing content. [12]. Given its wide-ranging benefits, information technology should be used wisely and effectively. Many social media platforms can be utilized, such as WhatsApp, Facebook, Instagram, and YouTube.

1.2.3. The Kirkpatrick Method

The Kirkpatrick method is used to evaluate the effectiveness of development programs. [9]. This evaluation model, known as Kirkpatrick's Four-Level Evaluation, was introduced by Dr. Donald Kirkpatrick in 1959. The model consists of four levels: Reaction, Learning, Behavior, and Results.

Level 1: Reaction aims to measure participants' positive reactions to the training materials delivered [13]. The quality of the training is assessed based on the level of participant satisfaction, typically measured through evaluation questionnaires completed after the training sessions.

Level 2: Learning assesses the extent to which participants have gained knowledge, developed attitudes, and acquired skills from the training. It determines whether or not improvement has occurred by comparing pre-test and post-test scores.

Level 3: Behavior focuses on identifying behavioral changes in participants after they return to their work environment. This level of evaluation requires a longer period, typically a minimum of six months, to observe any changes in behavior [9].

Level 4: Results evaluate the overall impact of the training program. It is the final stage in the evaluation process and seeks to determine whether the intended outcomes of the training have been achieved.

1.3. Research Objective

This study analyzes a Kirkpatrick-based evaluation of extension activities on the utilization of information technology to improve services in the PPHPM Cooperative (Horticultural Farmers Association of Mount Merapi).

2. MATERIALS AND METHODS

The extension activity on the utilization of information technology to improve services at the PPHPM Cooperative (Horticultural Farmers Association of Mount Merapi) was conducted in April 2025 in Purwobinangun Village, Pakem Sub-district, Sleman Regency. The duration of the extension was 60 minutes. Participants included 20 administrators and members of the PPHPM Cooperative. The method used in this extension was descriptive analysis. The steps taken to achieve the objective of improving services through the use of information technology were as follows: First, the extension was delivered through lectures, discussions, and hands-on practice. The activity began with participants completing a pre-test to measure knowledge, attitudes, and skills. Second, the extension continued with direct practice in utilizing information technology, guided by the instructor. Third, evaluation was conducted through a post-test questionnaire measuring participant reactions, knowledge, attitudes, and skills according to the Kirkpatrick method.

The extension team consisted of lecturers and students from the Sustainable Agricultural Extension Study Program at Politeknik Pembangunan Pertanian Yogyakarta Magelang.

3. RESULT AND DISCUSSION

The evaluation of the extension at the Reaction level (Level 1) used a Likert scale from 1 to 5 to measure participant satisfaction with the extension activities conducted. The Learning level evaluation (Level 2) assessed the knowledge, attitudes, and skills of 20 extension participants who completed the questionnaire.

Knowledge was measured through a questionnaire consisting of 10 true-or-false questions, with correct answers scored as 1 and incorrect answers as 0. Attitudes were assessed using a Likert scale from 1 to 5 across 7 statements. The skills assessment focused on the use of information technology covered in the extension, specifically social media usage, including account creation, content creation, and content publication.

Table 1. Reaction Stage Evaluation

No	Variable	Score
1	The material was relevant to the participants' needs	4.65
2	The material can enhance skills in using information technology.	4.65
3	The resource person was able to deliver the material effectively	4.6
4	Facilities and infrastructure were adequate	4.6
5	The implementation stages were carried out appropriately	4.6
6	The training duration was appropriate	4.55
7	Participants were actively involved	4.65
	Amount	32.3
	Category	Strongly Agree
	Average	4.61

The results showed an overall score of 32.3, indicating that participants were very satisfied with the training on utilizing information technology to improve services. The highest scores were in the categories of material relevance to needs, the ability of the material to enhance participants' skills, and active participant involvement. Participants felt that the extension material on using information technology to improve services was helpful. The lowest score was related to the training duration; however, despite being the lowest, this score was still relatively high and reflected a positive response.

Table 2. Learning Stage Evaluation

No	Variable	Score		
		Knowledge	Attitude	Skills
1	Pre	97%	96.4%	0%
2	Post	98.5%	98.4%	91.67%
3	Score Increased	1.5%	2%	91.67%

The learning evaluation (Level 2) of the extension assessed the knowledge, attitudes, and skills of 20 participants. The pre-test and post-test results showed an increase of 1.5% in knowledge, 2% in attitudes, and 91.67% in skills. To confirm the

differences between pre-test and post-test scores, a Wilcoxon signed-rank test was conducted with a significance level of 0.05. The Wilcoxon test results showed a significance value greater than 0.05 for knowledge and attitudes, indicating no significant difference between pre-test and post-test in these aspects. However, the test results for skills showed a significance value less than 0.05, indicating a significant difference. The effectiveness of the extension activities can be seen in Table 3.

Table 3. Agricultural Extension Evaluation

No	Variable	Score		
		Knowledge	Attitude	Skills
1	Pre	9.7	24.1	0
2	Post	9.85	24.6	2.75
3	Maximum score	10	25	3
4	Target	0.3	0.9	3
	Improvement (c-a)			
5	Behavior	0.15	0.5	2.75
	occurrence (b-a)			
6	Extension	1.5%	2%	91.67%
	effectiveness (e/c)			
7	Behavior change	50%	55%	91.67%
	effectiveness (e/d)			

According to Ref. [14] Extension effectiveness and behavior change effectiveness are categorized as effective if $\geq 66\%$, fairly effective if between 33% and 66%, and less effective if $< 33\%$. In the conducted extension, the extension effectiveness (EE) in increasing knowledge was 1.5% (less effective), attitude 2% (less effective), and skills 91.67% (effective). This indicates that the extension activities were less effective in improving knowledge and attitudes related to the utilization of information technology for service improvement, but were able to effectively enhance skills in utilizing information technology to improve services.

Regarding knowledge, the PPHPM management already had social media accounts and were familiar with information technology and social media. The attitude aspect was influenced by the awareness among PPHPM management that information technology is important to utilize. The skill aspect was affected by the limited depth of social media use among PPHPM management, indicating the need for further training and practice to improve proficiency.

The behavior change effectiveness was 50% for knowledge (fairly effective), 55% for attitude (fairly effective), and 91.67% for skills (effective). This suggests that the increases in knowledge and attitude were fairly effective in adding new insights and awareness among PPHPM management, while the improvement in skills was effective in enabling them to apply the information technology utilization material provided.

4. CONCLUSION

This extension activity aimed to educate the administrators of PPHPM on utilizing information technology to improve services at PPHPM. The methods used in the extension included lectures, discussions, and hands-on practice. The evaluation of the extension's success was conducted using pre-test and post-test questionnaires, analyzed through the Kirkpatrick evaluation model.

The Level 1 evaluation (Reaction) showed a score of 32.3 or an average of 4.61, indicating that participants were satisfied with the material and preparation provided by the resource persons. The Level 2 evaluation (Learning), based on pre-test and post-test results, showed improvements of 0.15 in knowledge, 0.5 in attitudes, and 2.75 in skills. The Extension Effectiveness (EE) in increasing knowledge was 1.5% (categorized as less effective), attitudes 2% (less effective), and skills 91.67% (effective). The Extension Behavior Change Effectiveness (EBCE) for knowledge was 50% (moderately effective), attitudes 55% (moderately effective), and skills 91.67% (effective). The evaluation stages completed so far are limited to Reaction (Level 1) and Learning (Level 2). The Level 3 evaluation (Behavior) has not yet been conducted as it requires a minimum of six months to assess behavioral changes.

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